CLAIMS

We claim:

1.   A method for discriminatively selecting keyframes representative of segments of a source digital media, comprising the steps of:

5   obtaining said source digital media for which keyframes are to be selected, wherein said digital information contains a plurality of segments;

        pre-processing said digital information to obtain a plurality of feature vectors; and

        discriminatively selecting a keyframe for each segment that is both representative of said segment and distinguishable from other selected keyframes.

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2.   The method of Claim 1, wherein said step of discriminatively selecting a keyframe includes:

        maximizing a goodness function F for said digital media.

15   3.   The method of Claim 1, wherein said source digital media includes a plurality of items of digital media.

4.   The method of Claim 3, comprising the step of:

        concatenating said plurality of items of digital media into one item of source

20   digital media.

5.   The method of Claim 1, wherein said source digital media is digital video.

6. The method of Claim 1, wherein said source digital media is a digital image.

7. The method of Claim 1, wherein said source digital media is digital audio.

5   8. The method of Claim 1, wherein said source digital media is a digital text.

9. The method of Claim 1, wherein said source digital media is a concatenation of digital video and a digital image.

10   10. The method of Claim 1, further comprising the step of:

determining, subsequent to said step of obtaining, if said source digital media includes more than one item of digital media.

11. The method of Claim 1, further comprising the step of:

15   concatenating said digital media into one item of source digital media if it is determined that said source digital media includes more than one item of digital media.

12. The method of Claim 1, wherein each of said plurality of feature vectors are representative of a frame of said source digital media.

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13. The method of Claim 1, wherein each of said discriminatively selected keyframes are representative of a respective segment of said source digital media.

14.   The method of Claim 1, wherein said step of discriminatively selecting a keyframe further includes the steps of:

comparing a candidate keyframe with other frames from a segment; and,

determining a similarity value of said candidate keyframe dependent upon said step of comparing.

15.   The method of Claim 1, wherein said step of discriminatively selecting a keyframe further includes the steps of:

comparing a candidate keyframe of one segment with other frames from the remaining plurality of segments; and,

determining a dis-similarity value of said candidate keyframe dependent upon said step of comparing.

16.   The method of Claim 1, wherein said step of discriminatively selecting a keyframe further includes the steps of:

comparing a candidate keyframe for a first segment of said plurality of segments with other frames from said first segment;

determining a similarity value of said candidate keyframe dependent upon said step of comparing a candidate keyframe for a first segment;

comparing said candidate keyframe with frames from the remaining plurality of segments;

determining a dis-similarity value of said candidate keyframe dependent upon said step of comparing said candidate keyframe with frames from the remaining plurality of segments; and,

selecting a keyframe based upon said similarity value and said dis-similarity value
5   that is both representative of said first segment and distinguishable from other selected keyframes.

17.   A method for discriminatively selecting keyframes representative of digital information, comprising the steps of:
10   obtaining said digital information for which a keyframes are to be selected,

        segmenting said digital information into a plurality of segments;

        pre-processing said digital information to obtain a plurality of feature vectors; and

        discriminatively selecting a keyframe for each segment that is both representative of said segment and distinguishable from other selected keyframes.

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18.   The method of Claim 17, wherein said step of discriminatively selecting a keyframe includes the steps of:

        determining an in-class similarity measure for each of said keyframes by comparing each keyframe with other frames of a segment for which the keyframe
20   represents;

        determining an out-of-class dis-similarity measure for each of said keyframes by comparing said keyframes with frame of other segments of said digital media; and,

selecting a keyframe for each segment by maximizing a goodness function over all frames within each segment.

19.   The method of Claim 18, wherein said step of discriminatively selecting a keyframe includes the steps of:

biasing the in-class similarity versus the out-of-class dis-similarity.

20.   The method of Claim 17, wherein said step of discriminatively selecting a keyframe includes the step of discriminatively selecting a plurality of keyframes as representatives for each segment.

21.   An article of manufacture including an information storage medium wherein is stored information for programming a computer to perform the method of discriminatively selecting keyframes representative of digital media, comprising the steps of:

obtaining said digital media for which keyframes are to be selected,

segmenting said digital information into a plurality of segments;

pre-processing said digital information to obtain a plurality of feature vectors; and

discriminatively selecting a keyframe for each segment that is both representative of said segment and distinguishable from other selected keyframes.